eurofins | Spectrum Analytical

☑ Final Report
☐ Revised Report

Report Date:
09-Oct-18 16:16

# *Laboratory Report*
# SC50648

Gulf Oil L.P.
281 Eastern Avenue
Chelsea, MA 02150
Attn: Andrew P. Adams

Project: Gulf Terminal - Chelsea, MA
Project #: [none]

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.

Massachusetts # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87936
Maine # MA138
New Hampshire # 2972/2538
New Jersey # MA011
New York # 11393
Pennsylvania # 68-04426/68-02924
Rhode Island # LAO00348
USDA # P330-15-00375
Vermont # VT-11393

Authorized by:

Dawn Wojcik
Laboratory Director

Please note that this report contains 3 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

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## Sample Summary

**Work Order:** SC50648

**Project:** Gulf Terminal - Chelsea, MA

**Project Number:** [none]

| Laboratory ID | Client Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| SC50648-01 | Outfall 003 | Surface Water | 20-Sep-18 11:50 | 20-Sep-18 14:05 |
| SC50648-02 | Creek | Surface Water | 20-Sep-18 12:05 | 20-Sep-18 14:05 |

**CASE NARRATIVE:**

Please note this report contains 30 pages of analytical data from New England BioAssay.

New England Bioassay

A Division of GZA

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

77 Batson Drive
Manchester, CT 06042
T: 860.643.9560
F: 860.646.7169
www.nebio.com

# ACUTE AQUATIC TOXICITY TEST REPORT

**Gulf Oil Terminal**
**Chelsea, MA**

Test Start Date: September 20, 2018

Test Period: September 2018

Report Prepared by:

New England Bioassay
A Division of GZA GeoEnvironmental, Inc.
77 Batson Dr.
Manchester, CT 06042

NEB Project Number: 05.0045469.00

Report Date: October 9, 2018

Report Submitted to:

Eurofins Spectrum Analytical, Inc.
11 Almgren Drive
Agawam, MA 01001

Sample ID: SC50648-01 / 02

# Whole Effluent Toxicity Testing Report Instruction Form

Client Name/Project: Eurofins / Gulf Oil Terminal  Test Date: 9/20/18

Sample ID: SC50648-01 / 02

**Your results were as follows:**

☒ Monitoring Only

□ Fail – Please proceed according to the instructions in your permit.

□ Invalid – **Retesting is still required. Retest report will be sent at a later date under separate cover.**

□ Original Test Invalid – **Valid retest performed. Both test and retest results are attached.**

□ Retesting will be or has been performed according to the Case 1 Protocols outlined in the attached copy of EPA-New England's species-specific, self-implementing policy for alternate dilution water.

□ This is your _____ case of dilution water toxicity. Please proceed according to the Case 2 Protocols outlined in the attached copy of EPA-New England's species-specific, self-implementing policy for alternate dilution water. The alternate dilution water you select for future tests for this species should be described as follows: "synthetic laboratory water made up according to EPA's toxicity test protocols, by adding specified amounts of salts into deionized water in order to match the hardness of our receiving water." Writing this letter should help you to avoid retests in the future.

□ Available information is insufficient to determine whether this test passed or failed. Please compare results to your permit limits. Please submit a current copy of your permit to the NEB Lab so that we can determine the status of future tests results and help ensure your compliance with permit requirements.

**Please complete the items on this list before reporting these results according to the instructions in the "Monitoring and Reporting" Section of your permit.**

- Please complete, sign and date the upper portion of the "Whole Effluent Toxicity Test Report Certification" page which is the page directly following this page.
- Fill in the Sample Type and Sample Method (upper right) and the Permit Limits (lower left) on the New England Bioassay - EPA Toxicity Test Summary Sheet(s) if they are incomplete.
- Fill in any missing information on the NEB Chain-of-Custody documents. This includes ensuring that the following information is recorded: Sampler's name and title, Facility name and address, Sample collection methods, Sample collection start and end dates and times, Types of sample, Chlorination status of samples upon shipment to NEB, Site description and Sample collection procedures.
- Monitoring results should be summarized on your monthly Discharge Monitoring Report Form.
- Signed and dated originals of this report must be submitted to the State (and Federal) Agencies specified in the "Monitoring and Reporting" section of your permit.

**Questions? Please contact the Lab Manager, Kim Wills, at (860) 858-3153 or kimberly.wills@gza.com.**

**WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION** (Permittee)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on _____ _____
[Date] [Authorized Signature]

_____
[Print or Type Name and Title]

_____
[Print or Type the Permittee's Name]

_____
[Print or Type the NPDES Permit No.]

Since the WET test and report check is complicated, the New England Bioassay Aquatic Toxicity Laboratory has certified the validity of the WET test data in the section below. Please note that this does not relieve the permittee from its responsibility to sign and certify the report under 40 C.F.R. S 122.41(k).

**WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION** (Bioassay Laboratory)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on 10/9/18 _____
[Date] [Authorized Signature]

Kim Wills, Laboratory Manager
[Print or Type Name and Title]

New England Bioassay
[Print or Type Name of Bioassay Laboratory]

24. Telephone Contacts
If you have questions, please contact Joy Hilton, Water Technical Unit, at (617) 918-1877 or David McDonald, Ecosystem Assessment Unit, at (617) 918-8609.

NEW ENGLAND BIOASSAY, A DIVISION OF GZA EPA TEST SUMMARY SHEET

Facility Name: Gulf Oil Terminal  Test Start Date: 9/20/18
NPDES Permit Number: MA0001091  Outfall Number: 003

| Test Type | Test Species | Sample Type | Sample Method |
|---|---|---|---|
| X Acute | _ Fathead Minnow | _ Prechlorinated | X Grab |
| _ Chronic | _ Ceriodaphnia Dubia | _ Dechlorinated | _ Composite |
| _ Modified | _ Daphnia Pulex | _ Unchlorinated | _ Flow-thru |
| (Chronic reporting | X Mysid Shrimp | _ Chlorinated | _ Other |
| LC50 values) | _ Sheepshead | | |
| _ 24-Hour Screening | _ Menidia | | |
| | _ Sea Urchin | TRC conc. 0.175 mg/L | |
| | _ Selenastrum | | |
| | _Other_____ | | |

Dilution Water

X Receiving water collected at a point immediately upstream of or away from the discharge; (Receiving water name and sampling location: Chelsea River )

_ Alternate Surface Water of known quality and a hardness to generally reflect the characteristics of the receiving water; (Surface water name:_____)

_ Synthetic water prepared using either Millipore Mill-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water;

_ Artificial sea salts mixed with deionized water;

_ Other_____

Effluent Sampling Date(s): 9/20/18

Effluent Concentrations Tested (in%): 0 6.25 12.5 25 50 100
* (Permit Limit Concentration): monitoring only

Was effluent salinity adjusted? Yes If yes, to what value? 25 ppt

Reference Toxicant test date: 10/1/18 Reference Toxicant Test Acceptable: Yes X No _

Age and Age Range of Test Organisms 3 days (< 24 hours) Source of Organisms NEB

## TEST RESULTS &PERMIT LIMITS

### Test Acceptability Criteria

A. Synthetic Water Control
Mean Control Survival: 100%  Mean Control Reproduction: N/A
Mean Control Weight: N/A  Mean Control % Fertilization: N/A

B. Receiving Water Control
Mean Control Survival: 100%  Mean Control Reproduction: N/A
Mean Control Weight: N/A  Mean Control % Fertilization: N/A

C. Lab Culture Control Yes_ No X

D. Thiosulfate Control Yes_ No X

### Test Variability

Test PMSD (growth) N/A
Test PMSD (reproduction.) N/A

## Permit Limits & Test Results

| | Limits | | Results |
|---|---|---|---|
| LC50 | N/A | LC50 | >100% |
| | | Upper Value | ± ∞ |
| | | Lower Value | 100% |
| | | Data Analysis Method Used | Graphical |
| A-NOEC | N/A | A-NOEC | 100% |
| C-NOEC | N/A | C-NOEC | N/A |
| | | LOEC | N/A |
| IC25 | N/A | IC25 | ------- |
| IC50 | N/A | IC50 | ------- |

## PMSD Comparison Discussion – N/A

## Concentration-Response Evaluation

The concentration-response relationship observed in this data set corresponds to the following item number in Chapter Four of "Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)", EPA 821-B-00-004, July 2000:

X 1. Ideal concentration-response relationship
_ 2. All or nothing response
_ 3. Stimulatory response at low concentrations and detrimental effects at higher concentrations
_ 4. Stimulation at low concentrations but no significant effect at higher concentrations
_ 5. Interrupted concentration-response: significant effects bracketed by non-significant effects
_ 6. Interrupted concentration-response: non-significant effects bracketed by significant effects
_ 7. Significant effects only at highest concentration
_ 8. Significant effects at all test concentrations but flat concentration-response curve
_ 9. Significant effects at all test concentrations with a sloped concentration-response curve
_ 10. Inverse concentration-response relationship

The concentration-response relationship was reviewed according to the above guidance document and the following determination was made:

X 1. Results are reliable and should be reported.
_ 2. Results are anomalous. An explanation is provided in the body of the report.
_ 3. Results are inconclusive and the test should be repeated with a newly collected sample. An explanation is provided in the body of the report.

NEW ENGLAND BIOASSAY, A DIVISION OF GZA EPA TEST SUMMARY SHEET

Facility Name: Gulf Oil Terminal  Test Start Date: 9/20/18
NPDES Permit Number: MA0001091  Outfall Number: 003

| Test Type | Test Species | Sample Type | Sample Method |
|---|---|---|---|
| X Acute | _ Fathead Minnow | _ Prechlorinated | X Grab |
| _ Chronic | _ Ceriodaphnia Dubia | _ Dechlorinated | _ Composite |
| _ Modified | _ Daphnia Pulex | _ Unchlorinated | _ Flow-thru |
| (Chronic reporting | _ Mysid Shrimp | _ Chlorinated | _ Other |
| LC50 values) | _ Sheepshead | | |
| _ 24-Hour Screening | X Menidia | | |
| | _ Sea Urchin | TRC conc. 0.175 mg/L | |
| | _ Selenastrum | | |
| | _Other | | |

Dilution Water

X Receiving water collected at a point immediately upstream of or away from the discharge;
(Receiving water name and sampling location: Chelsea River )
_ Alternate Surface Water of known quality and a hardness to generally reflect the characteristics of the receiving water; (Surface water name: )
_ Synthetic water prepared using either Millipore Mill-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water;
_ Artificial sea salts mixed with deionized water;
_ Other

Effluent Sampling Date(s): 9/20/18

Effluent Concentrations Tested (in%): 0 6.25 12.5 25 50 100
* (Permit Limit Concentration): monitoring only

Was effluent salinity adjusted? Yes  If yes, to what value? 25 ppt

Reference Toxicant test date: 9/6/18  Reference Toxicant Test Acceptable: Yes X No _

Age and Age Range of Test Organisms 11 days (<24 hours)  Source of Organisms A.I.

TEST RESULTS &PERMIT LIMITS

Test Acceptability Criteria

A. Synthetic Water Control
Mean Control Survival: 100%  Mean Control Reproduction: N/A
Mean Control Weight: N/A  Mean Control % Fertilization: N/A

B. Receiving Water Control
Mean Control Survival: 97.5%  Mean Control Reproduction: N/A
Mean Control Weight: N/A  Mean Control % Fertilization: N/A

C. Lab Culture Control Yes_ No X

D. Thiosulfate Control Yes_ No X

Test Variability

Test PMSD (growth) N/A
Test PMSD (reproduction.) N/A

## Permit Limits & Test Results

| | Limits | | Results |
|---|---|---|---|
| LC50 | N/A | LC50 | >100% |
| | | Upper Value | ± ∞ |
| | | Lower Value | 100% |
| | | Data Analysis Method Used | Graphical |
| A-NOEC | N/A | A-NOEC | 100% |
| C-NOEC | N/A | C-NOEC | N/A |
| | | LOEC | N/A |
| IC25 | N/A | IC25 | ------- |
| IC50 | N/A | IC50 | ------- |

## PMSD Comparison Discussion – N/A

## Concentration-Response Evaluation

The concentration-response relationship observed in this data set corresponds to the following item number in Chapter Four of "Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)", EPA 821-B-00-004, July 2000:

X 1. Ideal concentration-response relationship
_ 2. All or nothing response
_ 3. Stimulatory response at low concentrations and detrimental effects at higher concentrations
_ 4. Stimulation at low concentrations but no significant effect at higher concentrations
_ 5. Interrupted concentration-response: significant effects bracketed by non-significant effects
_ 6. Interrupted concentration-response: non-significant effects bracketed by significant effects
_ 7. Significant effects only at highest concentration
_ 8. Significant effects at all test concentrations but flat concentration-response curve
_ 9. Significant effects at all test concentrations with a sloped concentration-response curve
_ 10. Inverse concentration-response relationship

The concentration-response relationship was reviewed according to the above guidance document and the following determination was made:

X 1. Results are reliable and should be reported.
_ 2. Results are anomalous. An explanation is provided in the body of the report.
_ 3. Results are inconclusive and the test should be repeated with a newly collected sample. An explanation is provided in the body of the report.

## *MYSIDOPSIS BAHIA* AQUATIC TOXICITY TEST REPORT

| | |
|---|---|
| **Test Reference Manual**: | EPA 821-R-02-012, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater Organisms and Marine Organisms", Fifth Edition |
| **Test Method:** | *Mysidopsis bahia* Acute Toxicity Test – Method 2007.0 |
| **Test Type**: | Acute Static Non-Renewal Saltwater Test |
| **Salinity**: | 25 ppt ± 10% for all dilutions by dry ocean salts (Instant Ocean) |
| **Temperature** : | 25 ± 1°C |
| **Light Quality**: | Ambient Laboratory Illumination |
| **Photoperiod:** | 16 hours light, 8 hours dark |
| **Test Chamber Size:** | 250 mL |
| **Test Solution Volume:** | Minimum 200 mL |
| **Age of Test Organisms:** | 3 days |
| **Number of Mysids Per Test Chamber:** | 10 |
| **Number of Replicate Test Chambers Per Treatment:** | 4 |
| **Total Number of Mysids Per Test Concentration:** | 40 |
| **Feeding Regime:** | Light feeding using concentrated *Artemia* nauplii while holding prior to initiating the test. |
| **Aeration:** | None |
| **Dilution Water**: | Chelsea River |
| **Alternate Control Water:** | NEB Artificial Salt Water (salinity 25 ppt) |
| **Effluent Concentrations**: | 0%, 6.25%, 12.5%, 25%, 50% and 100% effluent |
| **Test Duration:** | 48 hours |
| **Effect measured:** | Mortality – no movement of body appendages on gentle prodding. |
| **Test Acceptability:** | ≥ 90% survival of test organisms in control solution Yes X No _ |
| **Sampling Requirements:** | Samples first used within 36 hours of collection Yes X No _ |
| **Sample Volume Required:** | Minimum 2 liters |
| **Test Organism Source**: | New England Bioassay |

**Test Acceptability Criteria**: Mean Alternate Water Control Survival = 100%
Mean Dilution Water Control Survival = 100%

| **Test Results:** | Limits | Results |
|---|---|---|
| 48-hour LC50 | N/A | >100% |
| Upper Value | | ± ∞ |
| Lower Value | | 100% |
| Data Analysis Method Used | | Graphical |
| A-NOEC | | 100% |

**Reference Toxicant Data**:

| | |
|---|---|
| **Date**: | 10/1/18 |
| **Toxicant**: | Sodium Dodecyl Sulfate |
| **Dilution Water:** | NEB Artificial Salt Water |
| **Toxicant Source**: | New England Bioassay |
| **Organism Source**: | New England Bioassay |
| **48-hour LC50:** | 19.6 mg/L |
| **In Acceptable Range:** | Yes X No |

**Dechlorination Procedures**: Chlorine is measured using 4500 CL-G DPD Colorimetric Method.

X Dechlorination was not required.

_ Sample was dechlorinated by adding sodium thiosulfate to the sample prior to test initiation. Since dechlorination of the effluent was necessary, a thiosulfate control of diluent water spiked with sodium thiosulfate was also included in the test series. Chlorine was _____ mg/L in a dechlorinated sample.

X Chlorine Measurement in the effluent was elevated due to interference. Chlorine was <0.05 mg/L when measured using amperometric titration.

_ Total Residual Chlorine was re-measured following aeration, and was found to be _____ mg/L.

**Additional Notes or Other Conditions Affecting the Test**:

## *MENIDIA BERYLLINA* AQUATIC TOXICITY TEST REPORT

| | |
|---|---|
| **Test Reference Manual**: | EPA 821-R-02-012, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater Organisms and Marine Organisms", Fifth Edition |
| **Test Method:** | *Menidia beryllina* Acute Toxicity Test – Method 2006.0 |
| **Test Type**: | Acute Static Non-Renewal Saltwater Test |
| **Salinity**: | 25 ppt ± 2 ppt by adding dry ocean salts (Instant Ocean) |
| **Temperature** : | 25 ± 1°C |
| **Light Quality**: | Ambient Laboratory Illumination |
| **Photoperiod:** | 16 hours light, 8 hours dark |
| **Test Chamber Size:** | 250 mL |
| **Test Solution Volume:** | Minimum 200 mL/replicate |
| **Age of Test Organisms:** | 11 days old (24 hour age range) |
| **Number of Fish Per Test Chamber:** | 10 |
| **Number of Replicate Test Chambers Per Treatment:** | 4 |
| **Total Number of Organisms Per Test Concentration:** | 40 |
| **Feeding Regime:** | Light feeding using concentrated *Artemia* nauplii while holding prior to initiating the test. |
| **Aeration:** | None |
| **Dilution Water**: | Chelsea River |
| **Alternate Control Water:** | NEB Artificial Salt Water (salinity 25 ppt) |
| **Effluent Concentrations**: | 0%, 6.25%, 12.5%, 25%, 50% and 100% effluent |
| **Test Duration:** | 48 hours |
| **Effect measured:** | Mortality – no movement on gentle prodding. |
| **Test Acceptability:** | ≥ 90% survival of test organisms in control solution Yes X No _ |
| **Sampling Requirements:** | Samples first used within 36 hours of collection Yes X No _ |
| **Sample Volume Required:** | Minimum 2 liters |
| **Test Organism Source**: | Aquatic Indicators |
| **Test Acceptability Criteria**: | Mean Alternate Water Control Survival = 100%<br>Mean Dilution Water Control Survival = 97.5% |

**Test Results:**

| | Limits | Results |
|---|---|---|
| 48-hour LC50 | N/A | >100% |
| Upper Value | | ± ∞ |
| Lower Value | | 100% |
| Data Analysis Method Used | | Graphical |
| A-NOEC | | 100% |

**Reference Toxicant Data**:

| | |
|---|---|
| **Date**: | 9/20/18 |
| **Toxicant**: | Sodium Dodecyl Sulfate |
| **Dilution Water:** | NEB Artificial Salt Water |
| **Toxicant Source**: | New England Bioassay |
| **Organism Source**: | Aquatic Indicators |
| **48-hour LC50:** | 7.55 mg/L |
| **In Acceptable Range:** | Yes X No _____ |

**Dechlorination Procedures**: Chlorine is measured using 4500 CL-G DPD Colorimetric Method.

X Dechlorination was not required.

_ Sample was dechlorinated by adding sodium thiosulfate to the sample prior to test initiation. Since dechlorination of the effluent was necessary, a thiosulfate control of diluent water spiked with sodium thiosulfate was also included in the test series. Chlorine was _____ mg/L in a dechlorinated sample.

_ Chlorine Measurement was elevated due to interference. Chlorine was _____ mg/L in a filtered sample.

_ Total Residual Chlorine was re-measured following aeration, and was found to be _____ mg/L.

**Additional Notes or Other Conditions Affecting the Test**:

# NEW ENGLAND BIOASSAY ACUTE TOXICITY DATA FORM
# COVER SHEET FOR LC50 TESTS

| | | | |
|---|---|---|---|
| CLIENT: | Eurofins Spectrum Analytical | *M.bahia* TEST ID # | 18-1422a |
| ADDRESS: | 11 Almgren Drive | *M.beryllina* TEST ID # | 18-1422b |
| | Agawam, MA 01001 | COC # | c38-3632/33 |
| SAMPLE TYPE: | Gulf Terminal - Chelsea, MA | PROJECT # | 05.0045469.00 |
| DILUTION WATER: | Chelsea River | | |

Sample Date(s): 9/20/18 Received On: 9/20/18

## INVERTEBRATES

| | |
|---|---|
| TEST SET UP (TECH INIT) | DD |
| TEST SPECIES | *Mysidopsis bahia* |
| NEB LOT# | Mb18(9-17) |
| AGE | 3 days |
| TEST SOLUTION VOLUME (mls) | 200 |
| NO. ORGANISMS PER TEST CHAMBER | 10 |
| NO. ORGANISMS PER CONCENTRATION | 40 |
| NO. ORGANISMS PER CONTROL | 40 |

| | DATE | TIME |
|---|---|---|
| TEST START: | 9/20/18 | 1556 |
| TEST END: | 9/22/18 | 1615 |

## VERTEBRATES

| | |
|---|---|
| TEST SET UP (TECH INIT) | PD |
| TEST SPECIES | *Menidia beryllina* |
| NEB LOT# | Ss18AI(9-18) |
| AGE | 11 days |
| TEST SOLUTION VOLUME (mls) | 700 |
| NO. ORGANISMS PER TEST CHAMBER | 10 |
| NO. ORGANISMS PER CONCENTRATION | 40 |
| NO. ORGANISMS PER CONTROL | 40 |

| | DATE | TIME |
|---|---|---|
| TEST START: | 9/20/18 | 1559 |
| TEST END: | 9/22/18 | 1611 |

LABORATORY CONTROL WATER:

| | | | Salinity (ppt) | Alkalinity (mg/L $CaCO_3$) |
|---|---|---|---|---|
| ARTIFICIAL SW: | NEB BATCH# | CRIO38-041 | 25 | 120 |

## RESULTS OF *Mysidopsis bahia* LC50 TEST

| METHOD | LC50 (%) | 95% Confidence Limits |
|---|---|---|
| BINOMIAL/GRAPHICAL | >100% | 100%±∞ |
| PROBIT | | |
| SPEARMAN KARBER | | |
| NOAEL | 100% | |

## RESULTS OF *Menidia beryllina* LC50 TEST

| METHOD | LC50 (%) | 95% Confidence Limits |
|---|---|---|
| BINOMIAL/GRAPHICAL | >100% | 100%±∞ |
| PROBIT | | |
| SPEARMAN KARBER | | |
| NOAEL | 100% | |

NOEC: NO OBSERVABLE EFFECT CONCENTRATION

Comments:

REVIEWD BY: DATE: 10/9/18

**NEW ENGLAND BIOASSAY**
**Toxicity Test Data Sheet**

NEB Test #: 18-1422a
Project #: 05.0045469.00
Facility Name: Gulf Terminal - Chelsea, MA
Date Sampled: 9/20/18
Date Received: 9/20/18
Sample ID: Outfall 003

Test Organism: *Mysidopsis bahia*
Organism Age: 3 days
Test Duration: 48 (hours)
Beginning Date: 9/20/18 Time: 1556
Dilution Water Source: Chelsea River
Salinity: 27 ppt

| Effluent Conc. % | Number of Surviving Organisms | | | Dissolved Oxygen (mg/L) | | | Temperature ( °C ) | | | pH (su) | | | Salinity (ppt) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initials | 0 | TBP | PD | PD | DD | CW | PD | DD | CW | PD | DD | CW | PD | DD | CW |
| | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 |
| Control A | 10 | 10 | 10 | 7.3 | 6.5 | 5.4 | 25.0 | 24.0 | 24.0 | 8.0 | 8.0 | 7.9 | 25 | 25 | 26 |
| Control B | 10 | 10 | 10 | | 6.6 | 5.2 | | 24.0 | 24.0 | | 8.0 | 7.9 | | 25 | 26 |
| Control C | 10 | 10 | 10 | | 6.5 | 5.1 | | 24.0 | 24.0 | | 8.0 | 7.9 | | 25 | 26 |
| Control D | 10 | 10 | 10 | | 6.5 | 5.1 | | 24.0 | 24.0 | | 8.0 | 7.9 | | 26 | 26 |
| Diluent A | 10 | 10 | 10 | 7.3 | 6.5 | 5.2 | 26.0 | 24.0 | 24.0 | 7.7 | 7.9 | 7.8 | 27 | 28 | 28 |
| Diluent B | 10 | 10 | 10 | | 6.4 | 5.2 | | 24.0 | 24.0 | | 7.9 | 7.8 | | 28 | 28 |
| Diluent C | 10 | 10 | 10 | | 6.5 | 5.2 | | 24.0 | 24.0 | | 7.9 | 7.8 | | 28 | 28 |
| Diluent D | 10 | 10 | 10 | | 6.5 | 5.1 | | 24.0 | 24.0 | | 7.9 | 7.8 | | 28 | 28 |
| 6.25 A | 10 | 10 | 10 | 7.3 | 6.5 | 5.4 | 25.9 | 24.0 | 24.0 | 7.8 | 7.9 | 7.7 | 27 | 27 | 28 |
| 6.25 B | 10 | 10 | 10 | | 6.5 | 5.1 | | 24.0 | 24.0 | | 7.9 | 7.7 | | 27 | 28 |
| 6.25 C | 10 | 10 | 10 | | 6.4 | 5.1 | | 24.0 | 24.0 | | 7.9 | 7.7 | | 27 | 28 |
| 6.25 D | 10 | 10 | 10 | | 6.4 | 5.1 | | 24.0 | 24.0 | | 7.9 | 7.7 | | 28 | 28 |
| 12.5 A | 10 | 10 | 10 | 7.2 | 6.5 | 5.2 | 26.0 | 24.0 | 24.0 | 7.8 | 7.9 | 7.8 | 27 | 27 | 28 |
| 12.5 B | 10 | 10 | 10 | | 6.5 | 5.3 | | 24.0 | 24.0 | | 7.9 | 7.8 | | 27 | 28 |
| 12.5 C | 10 | 10 | 10 | | 6.5 | 5.2 | | 24.0 | 24.0 | | 7.9 | 7.8 | | 27 | 28 |
| 12.5 D | 10 | 10 | 10 | | 6.5 | 5.2 | | 24.0 | 24.0 | | 7.9 | 7.8 | | 28 | 28 |
| 25 A | 10 | 10 | 10 | 7.2 | 6.5 | 5.2 | 26.0 | 24.0 | 24.0 | 7.8 | 7.9 | 7.8 | 26 | 27 | 28 |
| 25 B | 10 | 10 | 10 | | 6.5 | 5.1 | | 24.0 | 24.0 | | 7.9 | 7.8 | | 27 | 27 |
| 25 C | 10 | 10 | 10 | | 6.5 | 5.1 | | 24.0 | 24.0 | | 7.9 | 7.8 | | 27 | 27 |
| 25 D | 10 | 10 | 10 | | 6.5 | 5.0 | | 24.0 | 24.0 | | 7.9 | 7.8 | | 27 | 28 |

| LC50 | Confidence Interval | A-NOEC | Computational Method |
|---|---|---|---|
| >100% | 100%±∞ | 100% | Graphical |

**NEW ENGLAND BIOASSAY**
**Toxicity Test Data Sheet**

NEB Test #: 18-1422a
Project #: 05.0045469.00
Facility Name: Gulf Terminal - Chelsea, MA
Date Sampled: 9/20/18
Date Received: 9/20/18
Sample ID: Outfall 003

Test Organism: *Mysidopsis bahia*
Organism Age: 3 days
Test Duration: 48 (hours)
Beginning Date: 9/20/18 Time: 1556
Dilution Water Source: Chelsea River
Salinity: 27 ppt

| Effluent Conc. % | Number of Surviving Organisms | | | Dissolved Oxygen (mg/L) | | | Temperature ( °C ) | | | pH (su) | | | Salinity (ppt) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initials | 0 | TBP | PD | PD | DD | CW | PD | DD | CW | PD | DD | CW | PD | DD | CW |
| | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 |
| 50 A | 10 | 10 | 10 | 7.2 | 6.5 | 5.0 | 25.9 | 24.0 | 24.0 | 7.9 | 8.0 | 7.8 | 25 | 26 | 27 |
| 50 B | 10 | 10 | 10 | | 6.5 | 4.9 | | 24.0 | 24.0 | | 8.0 | 7.8 | | 26 | 27 |
| 50 C | 10 | 10 | 10 | | 6.6 | 4.9 | | 24.0 | 24.0 | | 8.0 | 7.8 | | 26 | 27 |
| 50 D | 10 | 10 | 10 | | 6.5 | 4.9 | | 24.0 | 24.0 | | 8.0 | 7.8 | | 26 | 27 |
| 100 A | 10 | 10 | 10 | 7.3 | 6.4 | 5.0 | 25.8 | 24.0 | 24.0 | 8.0 | 8.1 | 7.9 | 24 | 24 | 25 |
| 100 B | 10 | 10 | 10 | | 6.4 | 5.0 | | 24.0 | 24.0 | | 8.1 | 7.9 | | 24 | 25 |
| 100 C | 10 | 10 | 10 | | 6.3 | 5.1 | | 24.0 | 24.0 | | 8.1 | 8.0 | | 24 | 25 |
| 100 D | 10 | 10 | 10 | | 6.3 | 5.1 | | 24.0 | 24.0 | | 8.1 | 8.0 | | 24 | 25 |
| | | | | | | | | | | | | | | | |
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| LC50 | Confidence Interval | A-NOEC | Computational Method |
|---|---|---|---|
| >100% | 100%±∞ | 100% | Graphical |

**Mysidopsis 96-h Acute Survival Test** — **New England Bioassay**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 16-8242-5088 | **Endpoint:** | 48h Survival Rate | **CETIS Version:** | CETISv1.9.4 |
| **Analyzed:** | 08 Oct-18 14:46 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Batch ID:** | 02-5224-6727 | **Test Type:** | Survival (48h) | **Analyst:** | |
| **Start Date:** | 20 Sep-18 15:56 | **Protocol:** | EPA/821/R-02-012 (2002) | **Diluent:** | Receiving Water |
| **Ending Date:** | 22 Sep-18 16:15 | **Species:** | Mysidopsis bahia | **Brine:** | Instant Ocean |
| **Test Length:** | 48h | **Taxon:** | Malacostraca | **Source:** | In-House Culture **Age:** 3 d |
| **Sample ID:** | 18-9760-4044 | **Code:** | 711B23CC | **Project:** | |
| **Sample Date:** | 20 Sep-18 11:50 | **Material:** | Not Applicable | **Source:** | Gulf Oil Terminal (MA0001091) |
| **Receipt Date:** | 20 Sep-18 14:05 | **CAS (PC):** | | **Station:** | |
| **Sample Age:** | 4h | **Client:** | Eurofins | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Log(X) | Linear | 1158728 | 200 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | % | 95% LCL | 95% UCL | TU | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|
| LC50 | >100 | n/a | n/a | <1 | n/a | n/a |

**48h Survival Rate Summary**

| | | | Calculated Variate(A/B) | | | | | | | Isotonic Variate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Code | Count | Mean | Min | Max | Std Dev | CV% | %Effect | A/B | Mean | %Effect |
| 0 | D | 4 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.0% | 40/40 | 1 | 0.0% |
| 6.25 | | 4 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.0% | 40/40 | 1 | 0.0% |
| 12.5 | | 4 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.0% | 40/40 | 1 | 0.0% |
| 25 | | 4 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.0% | 40/40 | 1 | 0.0% |
| 50 | | 4 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.0% | 40/40 | 1 | 0.0% |
| 100 | | 4 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.0% | 40/40 | 1 | 0.0% |

**48h Survival Rate Detail**

| Conc-% | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | D | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6.25 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 12.5 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 25 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 50 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 100 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

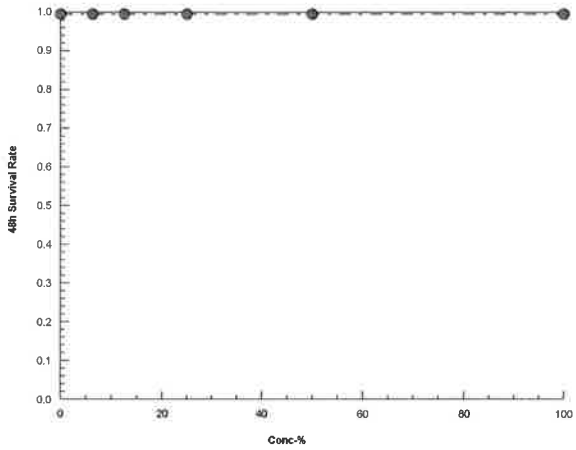
**48h Survival Rate Binomials**

| Conc-% | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | D | 10/10 | 10/10 | 10/10 | 10/10 |
| 6.25 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 12.5 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 25 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 50 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 100 | | 10/10 | 10/10 | 10/10 | 10/10 |

**Mysidopsis 96-h Acute Survival Test** — **New England Bioassay**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 16-8242-5088 | **Endpoint:** | 48h Survival Rate | **CETIS Version:** | CETISv1.9.4 |
| **Analyzed:** | 08 Oct-18 14:46 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |

**Graphics**



**Mysidopsis 96-h Acute Survival Test** — **New England Bioassay**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 19-8632-3953 | **Endpoint:** | 48h Survival Rate | **CETIS Version:** | CETISv1.9.4 |
| **Analyzed:** | 08 Oct-18 14:46 | **Analysis:** | Nonparametric-Control vs Treatments | **Status Level:** | 1 |
| **Batch ID:** | 02-5224-6727 | **Test Type:** | Survival (48h) | **Analyst:** | |
| **Start Date:** | 20 Sep-18 15:56 | **Protocol:** | EPA/821/R-02-012 (2002) | **Diluent:** | Receiving Water |
| **Ending Date:** | 22 Sep-18 16:15 | **Species:** | Mysidopsis bahia | **Brine:** | Instant Ocean |
| **Test Length:** | 48h | **Taxon:** | Malacostraca | **Source:** | In-House Culture **Age:** 3 d |
| **Sample ID:** | 18-9760-4044 | **Code:** | 711B23CC | **Project:** | |
| **Sample Date:** | 20 Sep-18 11:50 | **Material:** | Not Applicable | **Source:** | Gulf Oil Terminal (MA0001091) |
| **Receipt Date:** | 20 Sep-18 14:05 | **CAS (PC):** | | **Station:** | |
| **Sample Age:** | 4h | **Client:** | Eurofins | | |

| Data Transform | Alt Hyp | NOEL | LOEL | TOEL | TU |
|---|---|---|---|---|---|
| Angular (Corrected) | C > T | 100 | >100 | n/a | 1 |

**Steel Many-One Rank Sum Test**

| Control | vs | Conc-% | Test Stat | Critical | Ties | DF | P-Type | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Dilution Water | | 6.25 | 18 | 10 | 1 | 6 | Asymp | 0.8333 | Non-Significant Effect |
| | | 12.5 | 18 | 10 | 1 | 6 | Asymp | 0.8333 | Non-Significant Effect |
| | | 25 | 18 | 10 | 1 | 6 | Asymp | 0.8333 | Non-Significant Effect |
| | | 50 | 18 | 10 | 1 | 6 | Asymp | 0.8333 | Non-Significant Effect |
| | | 100 | 18 | 10 | 1 | 6 | Asymp | 0.8333 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0 | 0 | 5 | 65540 | <1.0E-37 | Significant Effect |
| Error | 0 | 0 | 18 | | | |
| Total | 0 | | 23 | | | |

**48h Survival Rate Summary**

| Conc-% | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | D | 4 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.00% |
| 6.25 | | 4 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.00% |
| 12.5 | | 4 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.00% |
| 25 | | 4 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.00% |
| 50 | | 4 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.00% |
| 100 | | 4 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | 0.00% |

**Angular (Corrected) Transformed Summary**

| Conc-% | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | D | 4 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 0 | 0.00% | 0.00% |
| 6.25 | | 4 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 0 | 0.00% | 0.00% |
| 12.5 | | 4 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 0 | 0.00% | 0.00% |
| 25 | | 4 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 0 | 0.00% | 0.00% |
| 50 | | 4 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 0 | 0.00% | 0.00% |
| 100 | | 4 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 0 | 0.00% | 0.00% |

**48h Survival Rate Detail**

| Conc-% | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | D | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6.25 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 12.5 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 25 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 50 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 100 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

**Mysidopsis 96-h Acute Survival Test** — **New England Bioassay**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 19-8632-3953 | **Endpoint:** | 48h Survival Rate | **CETIS Version:** | CETISv1.9.4 |
| **Analyzed:** | 08 Oct-18 14:46 | **Analysis:** | Nonparametric-Control vs Treatments | **Status Level:** | 1 |

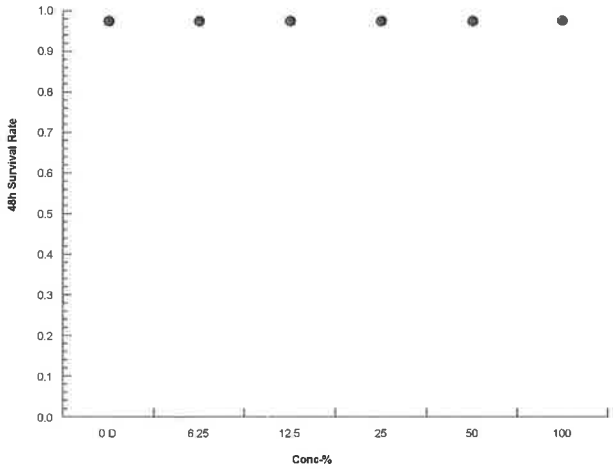
**Angular (Corrected) Transformed Detail**

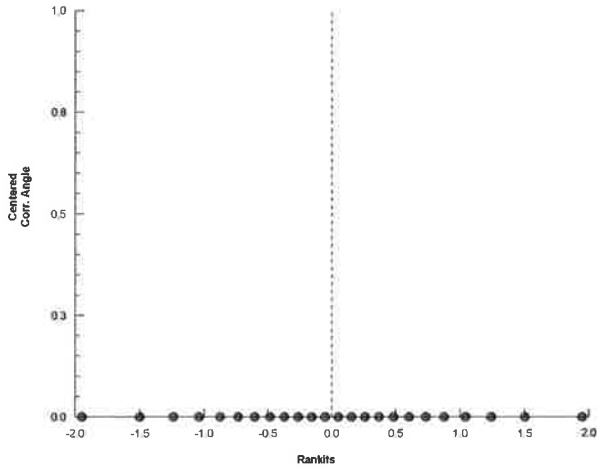
| Conc-% | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | D | 1.412 | 1.412 | 1.412 | 1.412 |
| 6.25 | | 1.412 | 1.412 | 1.412 | 1.412 |
| 12.5 | | 1.412 | 1.412 | 1.412 | 1.412 |
| 25 | | 1.412 | 1.412 | 1.412 | 1.412 |
| 50 | | 1.412 | 1.412 | 1.412 | 1.412 |
| 100 | | 1.412 | 1.412 | 1.412 | 1.412 |

**48h Survival Rate Binomials**

| Conc-% | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | D | 10/10 | 10/10 | 10/10 | 10/10 |
| 6.25 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 12.5 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 25 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 50 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 100 | | 10/10 | 10/10 | 10/10 | 10/10 |

**Graphics**



**NEW ENGLAND BIOASSAY**
**Toxicity Test Data Sheet**

NEB Test #: 18-1422b
Project #: 05.0045469.00
Facility Name: Gulf Terminal - Chelsea, MA
Date Sampled: 9/20/18
Date Received: 9/20/18
Sample ID: Outfall 003

Test Organism: *Menidia beryllina*
Organism Age: 11 days
Test Duration: 48 (hours)
Beginning Date: 9/20/18 Time: 1559
Dilution Water Source: Chelsea River
Salinity: 27 ppt

| Effluent Conc. % | Number of Surviving Organisms | | | Dissolved Oxygen (mg/L) | | | Temperature ( °C ) | | | pH (su) | | | Salinity (ppt) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initials | 0 | TBP | PD | PD | DD | CW | PD | DD | CW | PD | DD | CW | PD | DD | CW |
| | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 |
| Control A | 10 | 10 | 10 | 7.3 | 6.6 | 6.4 | 25.0 | 24.0 | 24.0 | 8.0 | 8.0 | 8.0 | 25 | 25 | 25 |
| Control B | 10 | 10 | 10 | | 6.5 | 6.3 | | 24.0 | 24.1 | | 8.1 | 8.0 | | 25 | 25 |
| Control C | 10 | 10 | 10 | | 6.5 | 6.1 | | 24.0 | 24.1 | | 8.1 | 8.0 | | 25 | 26 |
| Control D | 10 | 10 | 10 | | 6.4 | 5.9 | | 24.0 | 24.1 | | 8.1 | 8.0 | | 25 | 25 |
| Diluent A | 10 | 10 | 9 | 7.3 | 6.6 | 6.0 | 26.0 | 24.0 | 24.1 | 7.7 | 7.9 | 7.9 | 27 | 27 | 27 |
| Diluent B | 10 | 10 | 10 | | 6.5 | 6.1 | | 24.0 | 24.3 | | 7.9 | 7.9 | | 27 | 27 |
| Diluent C | 10 | 10 | 10 | | 6.5 | 6.0 | | 24.0 | 24.3 | | 7.9 | 7.9 | | 27 | 27 |
| Diluent D | 10 | 10 | 10 | | 6.5 | 6.0 | | 24.1 | 24.1 | | 7.9 | 7.9 | | 27 | 27 |
| 6.25 A | 10 | 10 | 10 | 7.3 | 6.6 | 6.1 | 25.9 | 24.0 | 24.3 | 7.8 | 7.9 | 7.9 | 27 | 27 | 27 |
| 6.25 B | 10 | 10 | 10 | | 6.5 | 6.1 | | 24.0 | 24.2 | | 7.9 | 7.9 | | 27 | 27 |
| 6.25 C | 10 | 10 | 8 | | 6.4 | 6.0 | | 24.0 | 24.2 | | 7.9 | 7.9 | | 27 | 27 |
| 6.25 D | 10 | 10 | 10 | | 6.3 | 5.9 | | 24.0 | 24.2 | | 7.9 | 7.9 | | 27 | 27 |
| 12.5 A | 10 | 10 | 10 | 7.2 | 6.5 | 5.9 | 26.0 | 24.2 | 24.3 | 7.8 | 7.9 | 7.9 | 27 | 27 | 27 |
| 12.5 B | 10 | 10 | 10 | | 6.4 | 6.0 | | 24.1 | 24.4 | | 7.9 | 7.9 | | 27 | 27 |
| 12.5 C | 10 | 10 | 10 | | 6.4 | 5.9 | | 24.0 | 24.3 | | 7.9 | 7.9 | | 27 | 27 |
| 12.5 D | 10 | 10 | 9 | | 6.4 | 5.9 | | 24.3 | 24.3 | | 7.9 | 7.9 | | 27 | 27 |
| 25 A | 10 | 10 | 10 | 7.2 | 6.4 | 6.0 | 26.0 | 24.3 | 24.5 | 7.8 | 7.9 | 7.9 | 26 | 26 | 27 |
| 25 B | 10 | 10 | 10 | | 6.3 | 6.0 | | 24.0 | 24.4 | | 7.9 | 7.9 | | 26 | 27 |
| 25 C | 10 | 10 | 10 | | 6.3 | 5.9 | | 24.1 | 24.4 | | 7.9 | 7.9 | | 26 | 27 |
| 25 D | 10 | 10 | 10 | | 6.4 | 5.9 | | 24.2 | 24.4 | | 7.9 | 7.9 | | 26 | 27 |

| LC50 | Confidence Interval | A-NOEC | Computational Method |
|---|---|---|---|
| >100% | 100%±∞ | 100% | Graphical |

**NEW ENGLAND BIOASSAY**
**Toxicity Test Data Sheet**

NEB Test #: 18-1422b
Project #: 05.0045469.00
Facility Name: Gulf Terminal - Chelsea, MA
Date Sampled: 9/20/18
Date Received: 9/20/18
Sample ID: Outfall 003

Test Organism: *Menidia beryllina*
Organism Age: 11 days
Test Duration: 48 (hours)
Beginning Date: 9/20/18 Time: 1559
Dilution Water Source: Chelsea River
Salinity: 27 ppt

| Effluent Conc. % | Number of Surviving Organisms | | | Dissolved Oxygen (mg/L) | | | Temperature ( °C ) | | | pH (su) | | | Salinity (ppt) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initials | 0 | TBP | PD | PD | DD | CW | PD | DD | CW | PD | DD | CW | PD | DD | CW |
| | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 |
| 50 A | 10 | 10 | 10 | 7.2 | 6.4 | 5.9 | 25.9 | 24.0 | 24.3 | 7.9 | 8.0 | 8.0 | 25 | 26 | 26 |
| 50 B | 10 | 10 | 10 | | 6.3 | 5.9 | | 24.2 | 24.4 | | 8.0 | 8.0 | | 26 | 26 |
| 50 C | 10 | 10 | 10 | | 6.4 | 5.9 | | 24.1 | 24.4 | | 8.0 | 8.0 | | 26 | 26 |
| 50 D | 10 | 10 | 10 | | 6.4 | 5.9 | | 24.0 | 24.4 | | 8.0 | 8.0 | | 26 | 26 |
| 100 A | 10 | 10 | 10 | 7.3 | 6.5 | 5.9 | 25.8 | 24.0 | 24.4 | 8.0 | 8.1 | 8.0 | 24 | 24 | 24 |
| 100 B | 10 | 10 | 10 | | 6.4 | 5.8 | | 24.1 | 24.3 | | 8.1 | 8.1 | | 24 | 24 |
| 100 C | 10 | 10 | 9 | | 6.3 | 5.9 | | 24.1 | 24.3 | | 8.1 | 8.1 | | 24 | 24 |
| 100 D | 10 | 10 | 10 | | 6.3 | 5.9 | | 24.2 | 24.3 | | 8.1 | 8.1 | | 24 | 24 |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
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| LC50 | Confidence Interval | A-NOEC | Computational Method |
|---|---|---|---|
| >100% | 100%±∞ | 100% | Graphical |

**Inland Silverside 96-h Acute Survival Test** — **New England Bioassay**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 19-2395-0108 | **Endpoint:** | 48h Survival Rate | **CETIS Version:** | CETISv1.9.4 |
| **Analyzed:** | 08 Oct-18 14:47 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Batch ID:** | 01-6270-9666 | **Test Type:** | Survival (48h) | **Analyst:** | |
| **Start Date:** | 20 Sep-18 15:59 | **Protocol:** | EPA/821/R-02-012 (2002) | **Diluent:** | Receiving Water |
| **Ending Date:** | 22 Sep-18 16:11 | **Species:** | Menidia beryllina | **Brine:** | Instant Ocean |
| **Test Length:** | 48h | **Taxon:** | Actinopterygii | **Source:** | In-House Culture **Age:** 11d |
| **Sample ID:** | 09-0721-2998 | **Code:** | 3612F8C6 | **Project:** | |
| **Sample Date:** | 20 Sep-18 11:50 | **Material:** | Not Applicable | **Source:** | Gulf Oil Terminal (MA0001091) |
| **Receipt Date:** | 20 Sep-18 14:05 | **CAS (PC):** | | **Station:** | |
| **Sample Age:** | 4h | **Client:** | Eurofins | | |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Log(X) | Linear | 2022426 | 200 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | % | 95% LCL | 95% UCL | TU | 95% LCL | 95% UCL |
|---|---|---|---|---|---|---|
| LC50 | >100 | n/a | n/a | <1 | n/a | n/a |

**48h Survival Rate Summary** — Calculated Variate(A/B) — Isotonic Variate

| Conc-% | Code | Count | Mean | Min | Max | Std Dev | CV% | %Effect | A/B | Mean | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | D | 4 | 0.9750 | 0.9000 | 1.0000 | 0.0500 | 5.13% | 0.0% | 39/40 | 0.98 | 0.0% |
| 6.25 | | 4 | 0.9500 | 0.8000 | 1.0000 | 0.1000 | 10.53% | 2.56% | 38/40 | 0.98 | 0.0% |
| 12.5 | | 4 | 0.9750 | 0.9000 | 1.0000 | 0.0500 | 5.13% | 0.0% | 39/40 | 0.98 | 0.0% |
| 25 | | 4 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | -2.56% | 40/40 | 0.98 | 0.0% |
| 50 | | 4 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | -2.56% | 40/40 | 0.98 | 0.0% |
| 100 | | 4 | 0.9750 | 0.9000 | 1.0000 | 0.0500 | 5.13% | 0.0% | 39/40 | 0.975 | 0.51% |

**48h Survival Rate Detail**

| Conc-% | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | D | 0.9000 | 1.0000 | 1.0000 | 1.0000 |
| 6.25 | | 1.0000 | 1.0000 | 0.8000 | 1.0000 |
| 12.5 | | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| 25 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 50 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 100 | | 1.0000 | 1.0000 | 0.9000 | 1.0000 |

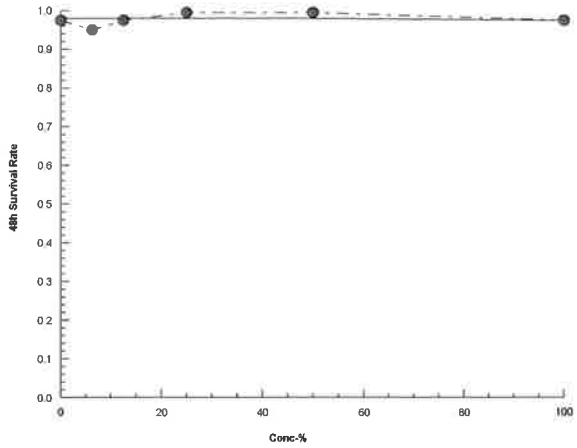
**48h Survival Rate Binomials**

| Conc-% | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | D | 9/10 | 10/10 | 10/10 | 10/10 |
| 6.25 | | 10/10 | 10/10 | 8/10 | 10/10 |
| 12.5 | | 10/10 | 10/10 | 10/10 | 9/10 |
| 25 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 50 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 100 | | 10/10 | 10/10 | 9/10 | 10/10 |

**Inland Silverside 96-h Acute Survival Test** **New England Bioassay**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 19-2395-0108 | **Endpoint:** | 48h Survival Rate | **CETIS Version:** | CETISv1.9.4 |
| **Analyzed:** | 08 Oct-18 14:47 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |

**Graphics**



**Inland Silverside 96-h Acute Survival Test** — **New England Bioassay**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 07-6037-8006 | **Endpoint:** | 48h Survival Rate | **CETIS Version:** | CETISv1.9.4 |
| **Analyzed:** | 08 Oct-18 14:47 | **Analysis:** | Nonparametric-Control vs Treatments | **Status Level:** | 1 |
| **Batch ID:** | 01-6270-9666 | **Test Type:** | Survival (48h) | **Analyst:** | |
| **Start Date:** | 20 Sep-18 15:59 | **Protocol:** | EPA/821/R-02-012 (2002) | **Diluent:** | Receiving Water |
| **Ending Date:** | 22 Sep-18 16:11 | **Species:** | Menidia beryllina | **Brine:** | Instant Ocean |
| **Test Length:** | 48h | **Taxon:** | Actinopterygii | **Source:** | In-House Culture **Age:** 11d |
| **Sample ID:** | 09-0721-2998 | **Code:** | 3612F8C6 | **Project:** | |
| **Sample Date:** | 20 Sep-18 11:50 | **Material:** | Not Applicable | **Source:** | Gulf Oil Terminal (MA0001091) |
| **Receipt Date:** | 20 Sep-18 14:05 | **CAS (PC):** | | **Station:** | |
| **Sample Age:** | 4h | **Client:** | Eurofins | | |

| Data Transform | Alt Hyp | NOEL | LOEL | TOEL | TU | PMSD |
|---|---|---|---|---|---|---|
| Angular (Corrected) | C > T | 100 | >100 | n/a | 1 | 9.09% |

**Steel Many-One Rank Sum Test**

| Control | vs | Conc-% | Test Stat | Critical | Ties | DF | P-Type | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Dilution Water | | 6.25 | 17.5 | 10 | 1 | 6 | Asymp | 0.7867 | Non-Significant Effect |
| | | 12.5 | 18 | 10 | 2 | 6 | Asymp | 0.8333 | Non-Significant Effect |
| | | 25 | 20 | 10 | 1 | 6 | Asymp | 0.9516 | Non-Significant Effect |
| | | 50 | 20 | 10 | 1 | 6 | Asymp | 0.9516 | Non-Significant Effect |
| | | 100 | 18 | 10 | 2 | 6 | Asymp | 0.8333 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.016902 | 0.0033804 | 5 | 0.47 | 0.7937 | Non-Significant Effect |
| Error | 0.129467 | 0.0071926 | 18 | | | |
| Total | 0.146369 | | 23 | | | |

**Distributional Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variances | Levene Equality of Variance Test | 4.23 | 4.248 | 0.0102 | Equal Variances |
| Variances | Mod Levene Equality of Variance Test | 0.47 | 4.248 | 0.7937 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality Test | 0.7605 | 0.884 | 7.1E-05 | Non-Normal Distribution |

**48h Survival Rate Summary**

| Conc-% | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | D | 4 | 0.9750 | 0.8954 | 1.0000 | 1.0000 | 0.9000 | 1.0000 | 0.0250 | 5.13% | 0.00% |
| 6.25 | | 4 | 0.9500 | 0.7909 | 1.0000 | 1.0000 | 0.8000 | 1.0000 | 0.0500 | 10.53% | 2.56% |
| 12.5 | | 4 | 0.9750 | 0.8954 | 1.0000 | 1.0000 | 0.9000 | 1.0000 | 0.0250 | 5.13% | 0.00% |
| 25 | | 4 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | -2.56% |
| 50 | | 4 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.00% | -2.56% |
| 100 | | 4 | 0.9750 | 0.8954 | 1.0000 | 1.0000 | 0.9000 | 1.0000 | 0.0250 | 5.13% | 0.00% |

**Angular (Corrected) Transformed Summary**

| Conc-% | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | D | 4 | 1.371 | 1.242 | 1.501 | 1.412 | 1.249 | 1.412 | 0.04074 | 5.94% | 0.00% |
| 6.25 | | 4 | 1.336 | 1.093 | 1.578 | 1.412 | 1.107 | 1.412 | 0.07622 | 11.41% | 2.59% |
| 12.5 | | 4 | 1.371 | 1.242 | 1.501 | 1.412 | 1.249 | 1.412 | 0.04074 | 5.94% | 0.00% |
| 25 | | 4 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 0 | 0.00% | -2.97% |
| 50 | | 4 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 1.412 | 0 | 0.00% | -2.97% |
| 100 | | 4 | 1.371 | 1.242 | 1.501 | 1.412 | 1.249 | 1.412 | 0.04074 | 5.94% | 0.00% |

**Inland Silverside 96-h Acute Survival Test** — **New England Bioassay**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 07-6037-8006 | **Endpoint:** | 48h Survival Rate | **CETIS Version:** | CETISv1.9.4 |
| **Analyzed:** | 08 Oct-18 14:47 | **Analysis:** | Nonparametric-Control vs Treatments | **Status Level:** | 1 |

**48h Survival Rate Detail**

| Conc-% | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | D | 0.9000 | 1.0000 | 1.0000 | 1.0000 |
| 6.25 | | 1.0000 | 1.0000 | 0.8000 | 1.0000 |
| 12.5 | | 1.0000 | 1.0000 | 1.0000 | 0.9000 |
| 25 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 50 | | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 100 | | 1.0000 | 1.0000 | 0.9000 | 1.0000 |

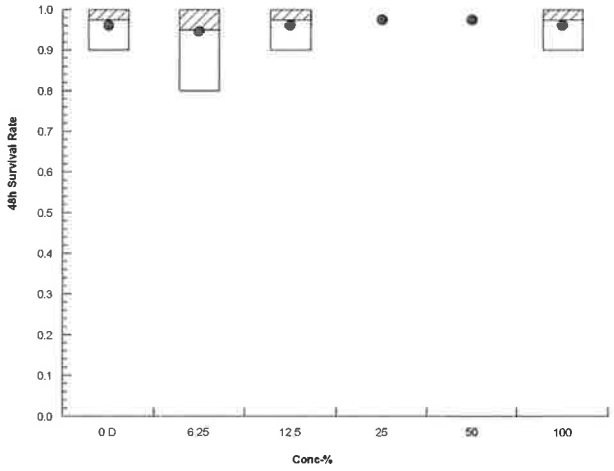
**Angular (Corrected) Transformed Detail**

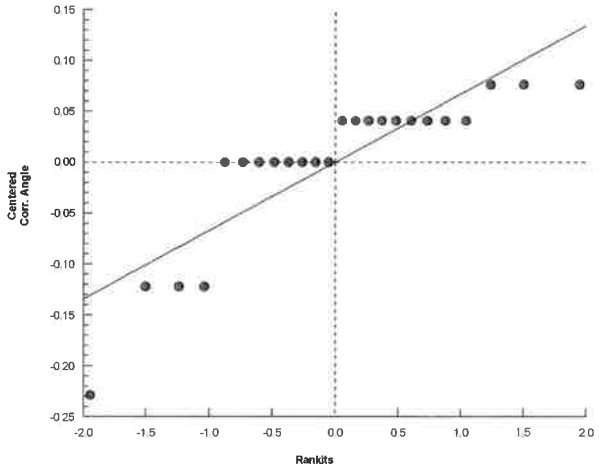
| Conc-% | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | D | 1.249 | 1.412 | 1.412 | 1.412 |
| 6.25 | | 1.412 | 1.412 | 1.107 | 1.412 |
| 12.5 | | 1.412 | 1.412 | 1.412 | 1.249 |
| 25 | | 1.412 | 1.412 | 1.412 | 1.412 |
| 50 | | 1.412 | 1.412 | 1.412 | 1.412 |
| 100 | | 1.412 | 1.412 | 1.249 | 1.412 |

**48h Survival Rate Binomials**

| Conc-% | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 |
|---|---|---|---|---|---|
| 0 | D | 9/10 | 10/10 | 10/10 | 10/10 |
| 6.25 | | 10/10 | 10/10 | 8/10 | 10/10 |
| 12.5 | | 10/10 | 10/10 | 10/10 | 9/10 |
| 25 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 50 | | 10/10 | 10/10 | 10/10 | 10/10 |
| 100 | | 10/10 | 10/10 | 9/10 | 10/10 |

**Graphics**



## INITIAL CHEMISTRY INFORMATION

CLIENT: Gulf Terminal - Chelsea, MA

PROJECT # 05.0045469.00

| RECIEPT DATE | 9/20/18 | |
|---|---|---|
| SAMPLE | Effluent | Receiving Water |
| COC # | C38-3632 | C38-3632 |
| Temperature (°C) | 14.6 | 14.3 |
| Dissolved Oxygen (mg/L) | 9.4 | 8.2 |
| pH (standard units) | 6.6 | 7.6 |
| Conductivity (µmhos/cm) | 251 | 42,820 |
| Salinity (ppt) | <1 | 27 |
| Hardness (as mg/L CaCO3) | 46 | 5000 |
| Alkalinity (as mg/L CaCO3) | 40 | 100 |
| TRC - DPD (mg/L) | 0.175* | 0.022 |
| INITIALS | KO | KO |

Additional notes:

Eff - 546g of IO added to ~20L of effluent to bring salinity up to 24ppt

* 0.182 mg/L after addition of salt, <0.05 mg/L when run using amperometri titration.

# NEB SALTWATER SPEC[illegible]S ACCLIMATION RECORD

| Species: *Menidia beryllina* | Client: Test ID: | Quantity: 1000 | *Mortality upon arrival 11 |
|---|---|---|---|
| Source: Aquatic Indicators | Lot #: SS18AI(9-18) | Age: 9 days on 9-18-18 | * Mortality > 10% - Notify management |

Allowable Mortality: > 5% mortality = Notify management.

Allowable Acclimation: Fish = No more than 50% tank volume water change over a 12 (twelve) hour period.

Mysids = Need to be +/- 2 ppt of test dilution water.

| Water Chemistry | | | | | | Observations | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | D.O. (mg/L) | p.H. (SU) | Temp. (C) * | Alkal. (mg/L) ml titrant | Sal. (ppt) ** | Feedings AM | Feedings NOON | Feedings PM | Behavioral observations A = Normal, B = Erratic mov. C = Dead | Do organisms look stressed? Yes / No | Mortalities # of dead organisms removed from tank | Comments / Treatment type |
| 9-18-18 | 14.4 | 7.4 | 23.6 | 195 / 3.9 ml | 25 | AM | KF | KF | A | No | 0 | Acclimated to ASW |
| 9-19-18 | 6.2 | | 24.5 | | 25 | KF | SJP | KF | A/C | No | 5 | $H_2O$ Δ w/ 6L ASW |
| 9-20-18 | 6.2 | | 23.4 | | 27 | KF | SJP | | | | | |

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

**Special Handling:**

- [x] Standard TAT - 7 to 10 business days
- [ ] Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Andrew Adams
Gulf Oil
281 Eastern Ave.
Chelsea MA. 02150
Telephone #: 617-884-5980
Project Mgr: A. Adams

Invoice To: Christopher Gill
Gulf Oil
80 Williams Street Suite 400
Wellesley MA. 02481-3705
P.O No.: _____ Quote #: _____

Project No: _____
Site Name: Gulf Chelsea Terminal
Location: Chelsea State: MA
Sampler(s): Aleksandar Marinkovic

F=Field Filtered 1=$Na_2S2O_3$ 2=HCl 3=$H_2SO_4$ 4=$HNO_3$ 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=$H_3PO_4$ 11= NONE 12= _____

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= _____ X2= _____ X3= _____

G= Grab C=Composite 1150

| Lab ID: | Sample ID: | Date: | Time: | Type | Matrix | # of VOA Vials | # of Amber Glass | # of Clear Glass | # of Plastic | Analysis: LC50 | Check if chlorinated |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CSS-31632 | Outfall 003 | 9-20-18 | [redacted] | G | SW | | | | 1 | ✓ | ☐ |
| CSS-31633 | Creek | 9-20-18 | 1205 | G | SW | | | | 1 | ✓ | ☐ |
| | | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |
| | Received ON ICE | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |

List Preservative Code below: 11

**QA/QC Reporting Notes:**
* additional charges may appply

MA DEP MCP CAM Report? [x] Yes [ ] No
CT DPH RCP Report? [ ] Yes [x] No
[x] Standard [ ] No QC [ ] DQA*
[ ] ASP A* [ ] ASP B*
[ ] NJ Reduced* [ ] NJ Full*
[ ] Tier II* [ ] Tier IV*
[ ] Other: _____
State-specific reporting standards:

| Relinquished by: | Received by: | Date: | Time: | Temp °C |
|---|---|---|---|---|
| | | 9-20-18 | 1405 | Observed |
| | | | | Correction Factor |
| | | | | Corrected |
| | | | | IR ID # |

[ ] EDD format: send report to
[x] E-mail to: jennifer.atkins@aecom.com

Condition upon receipt: Custody Seals: [ ] Present [ ] Intact [ ] Broken
[ ] Ambient [ ] Iced [ ] Refrigerated [ ] DI VOA Frozen [ ] Soil Jar Frozen

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# SUBCONTRACT ORDER

**SC50648**

**SENDING LABORATORY:**

Eurofins Spectrum Analytical, Inc.
11 Almgren Drive
Agawam, MA 01001
Phone: (413) 789-9018
Fax: (413) 789-4076
PM: SpectrumLabResults@EurofinsUS.com

**RECEIVING LABORATORY:**

GZA Geoenvironmental, Inc. - Manchester, CT*
77 Batson Drive
Manchester, CT 06042
Phone: (860) 286-8900
Fax: (860) 242-8389

**BILL TO:**

Eurofins Spectrum Analytical, Inc.
2425 New Holland Pike
Lancaster, PA 17601
Attention: Accounts Payable
accountspayable@eurofinsus.com
**PO Number:** SC50648

**Project:** Gulf Terminal - Chelsea, MA
**Project #:** [none]
**PO Number:** SC50648

| Laboratory ID | Sample ID | Sampled | Matrix | Analysis | Due | Comments |
|---|---|---|---|---|---|---|
| | SC50648-01 | 20-Sep-18 11:50 | Surface Water | Aquatic Tox | **04-Oct-18 16:00** | Client ID is Outfall 003 |
| *Containers Supplied:* 1/2 Gallon Jug (A) | | | | | | |
| | SC50648-02 | 20-Sep-18 12:05 | Surface Water | Aquatic Tox | **04-Oct-18 16:00** | Client ID is Creek |
| *Containers Supplied:* 1/2 Gallon Jug (A) | | | | | | |

***Please send notice within 24 hours of obtaining valid data, of the results of all drinking water samples that exceed any EPA or Department-established maximum contaminant level, maximum residual disinfectant level or reportable concentration. Notice should be emailed to SpectrumLabResults@EurofinsUS.com.***

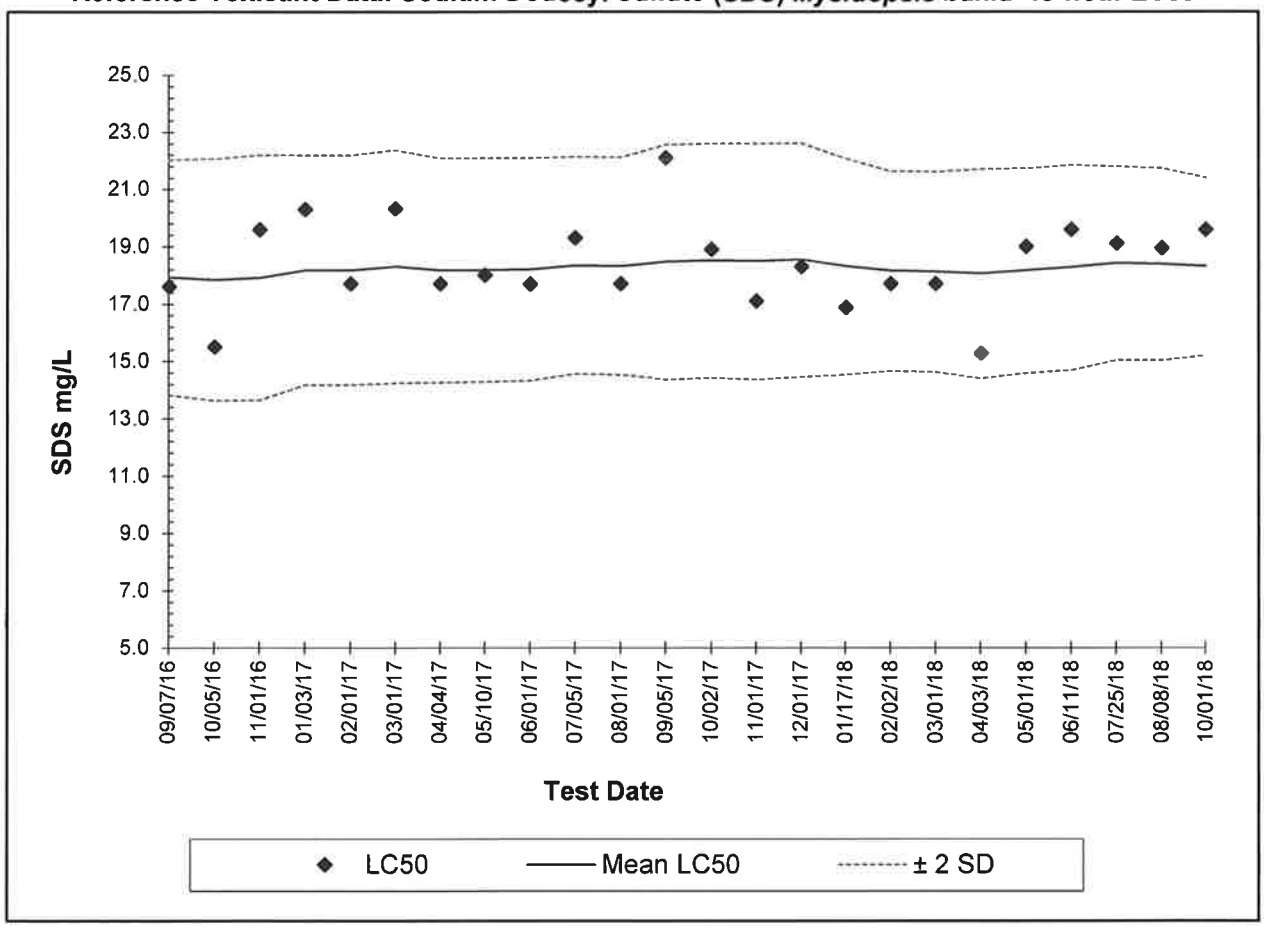
***Please notify SpectrumLabResults@EurofinsUS.com immediately and prior to conducting analysis if certification is not held for the analyses requested.***

***Please e-mail results in electronic format to SpectrumLabResults@EurofinsUS.com.***

| Released By | Date | Received By | Date | Temp °C |
|---|---|---|---|---|
| Released By | Date | Received By | Date | |

# New England Bioassay

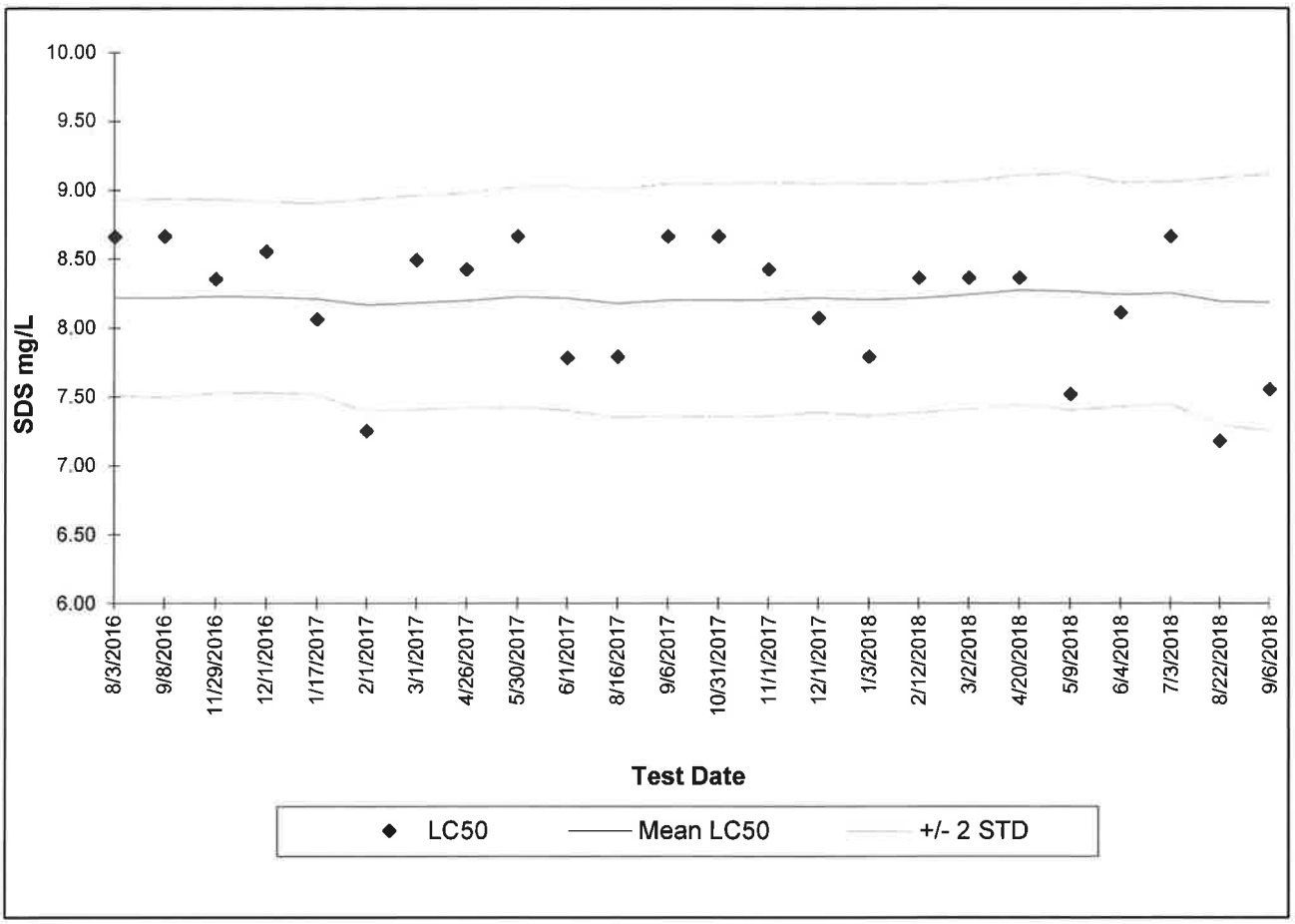
**Reference Toxicant Data: Sodium Dodecyl Sulfate (SDS) *Mysidopsis bahia* 48-hour LC50**




| Test ID | Date | $LC_{50}$ | Mean $LC_{50}$ | STD | -2STD | +2STD | CV | CV National 75th & 90th% |
|---|---|---|---|---|---|---|---|---|
| 16-1256 | 9/7/2016 | 17.6 | 17.9 | 2.1 | 13.8 | 22.0 | 0.13 | 0.26 |
| 16-1471 | 10/5/2016 | 15.5 | 17.8 | 2.1 | 13.6 | 22.1 | 0.11 | 0.26 |
| 16-1590 | 11/1/2016 | 19.6 | 17.9 | 2.1 | 13.6 | 22.2 | 0.12 | 0.26 |
| 17-9 | 1/3/2017 | 20.3 | 18.2 | 2.0 | 14.2 | 22.2 | 0.12 | 0.26 |
| 17-154 | 2/1/2017 | 17.7 | 18.2 | 2.0 | 14.2 | 22.2 | 0.11 | 0.26 |
| 17-273 | 3/1/2017 | 20.3 | 18.3 | 2.0 | 14.2 | 22.4 | 0.11 | 0.26 |
| 17-479 | 4/4/2017 | 17.7 | 18.2 | 2.0 | 14.3 | 22.1 | 0.11 | 0.26 |
| 17-697 | 5/10/2017 | 18.0 | 18.2 | 2.0 | 14.3 | 22.1 | 0.11 | 0.26 |
| 17-776 | 6/1/2017 | 17.7 | 18.2 | 1.9 | 14.3 | 22.1 | 0.11 | 0.26 |
| 17-977 | 7/5/2017 | 19.3 | 18.3 | 1.9 | 14.6 | 22.1 | 0.11 | 0.26 |
| 17-1144 | 8/1/2017 | 17.7 | 18.3 | 1.9 | 14.5 | 22.1 | 0.10 | 0.26 |
| 17-1329 | 9/5/2017 | 22.1 | 18.5 | 2.0 | 14.4 | 22.6 | 0.10 | 0.26 |
| 17-1520 | 10/2/2017 | 18.9 | 18.5 | 2.0 | 14.4 | 22.6 | 0.11 | 0.26 |
| 17-1693 | 11/1/2017 | 17.1 | 18.5 | 2.1 | 14.4 | 22.6 | 0.11 | 0.26 |
| 17-1804 | 12/1/2017 | 18.3 | 18.5 | 2.0 | 14.5 | 22.6 | 0.11 | 0.26 |
| 18-92 | 1/17/2018 | 16.9 | 18.3 | 1.9 | 14.6 | 22.1 | 0.11 | 0.26 |
| 18-188 | 2/2/2018 | 17.7 | 18.2 | 1.7 | 14.7 | 21.6 | 0.10 | 0.26 |
| 18-294 | 3/1/2018 | 17.7 | 18.1 | 1.7 | 14.6 | 21.6 | 0.10 | 0.26 |
| 18-469 | 4/3/2018 | 15.3 | 18.1 | 1.8 | 14.4 | 21.7 | 0.10 | 0.26 |
| 18-612 | 5/1/2018 | 19.0 | 18.2 | 1.8 | 14.6 | 21.7 | 0.10 | 0.26 |
| 18-815 | 6/11/2018 | 19.6 | 18.3 | 1.8 | 14.7 | 21.8 | 0.10 | 0.26 |
| 18-1086 | 7/25/2018 | 19.1 | 18.4 | 1.7 | 15.1 | 21.8 | 0.09 | 0.26 |
| 18-1156 | 8/8/2018 | 19.0 | 18.4 | 1.7 | 15.1 | 21.7 | 0.09 | 0.26 |
| 18-1470 | 10/1/2018 | 19.6 | 18.3 | 1.5 | 15.2 | 21.4 | 0.08 | 0.26 |

# New England Bioassay

## Reference Toxicant Data: Sodium Dodecyl Sulfate (SDS) *Menidia beryllina* 48-hour LC50




| Test ID | Date | $LC_{50}$ | Mean $LC_{50}$ | STD | -2STD | +2STD | CV | CV National 75th% | CV National 90th% |
|---|---|---|---|---|---|---|---|---|---|
| 16-1060 | 8/3/2016 | 8.66 | 8.21 | 0.36 | 7.50 | 8.93 | 0.04 | 0.21 | 0.44 |
| 16-1282 | 9/8/2016 | 8.66 | 8.21 | 0.36 | 7.49 | 8.94 | 0.04 | 0.21 | 0.44 |
| 16-1705 | 11/29/2016 | 8.35 | 8.23 | 0.35 | 7.52 | 8.93 | 0.04 | 0.21 | 0.44 |
| 16-1739 | 12/1/2016 | 8.55 | 8.22 | 0.35 | 7.53 | 8.92 | 0.04 | 0.21 | 0.44 |
| 17-83 | 1/17/2017 | 8.06 | 8.21 | 0.35 | 7.52 | 8.90 | 0.04 | 0.21 | 0.44 |
| 17-155 | 2/1/2017 | 7.25 | 8.16 | 0.39 | 7.39 | 8.93 | 0.05 | 0.21 | 0.44 |
| 17-278 | 3/1/2017 | 8.49 | 8.18 | 0.39 | 7.40 | 8.96 | 0.05 | 0.21 | 0.44 |
| 17-595 | 4/26/2017 | 8.42 | 8.20 | 0.39 | 7.42 | 8.98 | 0.05 | 0.21 | 0.44 |
| 17-758 | 5/30/2017 | 8.66 | 8.22 | 0.40 | 7.42 | 9.02 | 0.05 | 0.21 | 0.44 |
| 17-777 | 6/1/2017 | 7.78 | 8.21 | 0.41 | 7.40 | 9.03 | 0.05 | 0.21 | 0.44 |
| 17-1246 | 8/16/2017 | 7.79 | 8.18 | 0.41 | 7.35 | 9.00 | 0.05 | 0.21 | 0.44 |
| 17-1340 | 9/6/2017 | 8.66 | 8.20 | 0.42 | 7.35 | 9.05 | 0.05 | 0.21 | 0.44 |
| 17-1685 | 10/31/2017 | 8.66 | 8.20 | 0.42 | 7.35 | 9.05 | 0.05 | 0.21 | 0.44 |
| 17-1694 | 11/1/2017 | 8.42 | 8.20 | 0.42 | 7.36 | 9.05 | 0.05 | 0.21 | 0.44 |
| 17-1805 | 12/1/2017 | 8.07 | 8.22 | 0.42 | 7.38 | 9.05 | 0.05 | 0.21 | 0.44 |
| 18-17 | 1/3/2018 | 7.79 | 8.20 | 0.42 | 7.36 | 9.05 | 0.05 | 0.21 | 0.44 |
| 18-222 | 2/12/2018 | 8.36 | 8.22 | 0.42 | 7.39 | 9.05 | 0.05 | 0.21 | 0.44 |
| 18-295 | 3/2/2018 | 8.36 | 8.24 | 0.42 | 7.41 | 9.07 | 0.05 | 0.21 | 0.44 |
| 18-552 | 4/20/2018 | 8.36 | 8.27 | 0.42 | 7.44 | 9.10 | 0.05 | 0.21 | 0.44 |
| 18-655 | 5/9/2018 | 7.52 | 8.26 | 0.43 | 7.40 | 9.12 | 0.05 | 0.21 | 0.44 |
| 18-754 | 6/4/2018 | 8.11 | 8.24 | 0.41 | 7.43 | 9.05 | 0.05 | 0.21 | 0.44 |
| 18-916 | 7/3/2018 | 8.66 | 8.25 | 0.40 | 7.45 | 9.06 | 0.05 | 0.21 | 0.44 |
| 18-1182 | 8/22/2018 | 7.18 | 8.19 | 0.45 | 7.30 | 9.09 | 0.05 | 0.21 | 0.44 |
| 18-1307 | 9/6/2018 | 7.55 | 8.18 | 0.47 | 7.25 | 9.11 | 0.06 | 0.21 | 0.44 |

SC50648 By

eurofins | Spectrum Analytical

# CHAIN OF CUSTODY RECORD

Page 1 of 1

**Special Handling:**
- [x] Standard TAT - 7 to 10 business days
- [ ] Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Andrew Adams
Gulf Oil
281 Eastern Ave.
Chelsea MA. 02150
Telephone #: 617-884-5980
Project Mgr: A. Adams

Invoice To: Christopher Gill
Gulf Oil
80 Williams Street Suite 400
Wellesley MA. 02481-3705
P.O No.: _____ Quote #: _____

Project No: _____
Site Name: Gulf Chelsea Terminal
Location: Chelsea State: MA
Sampler(s): Aleksandar Marinkovic

F=Field Filtered 1=$Na_2S2O_3$ 2=HCl 3=$H_2SO_4$ 4=$HNO_3$ 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=$H_3PO_4$ 11= NONE 12= _____

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= _____ X2= _____ X3= _____

G= Grab C=Compsite 1150

| Lab ID: | Sample ID: | Date: | Time: | Type | Matrix | Containers: # of VOA Vials | # of Amber Glass | # of Clear Glass | # of Plastic | Analysis: List Preservative Code below: | Check if chlorinated |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 11 | |
| 18-3632 | Outfall 003 | 9-20-18 | [redacted] | G | SW | | | | 1 | ✓ LC50 | ☐ |
| 18-3633 | Creek | 9-20-18 | 1205 | G | SW | | | | 1 | ✓ | ☐ |
| | | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |
| | Received ON ICE | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |
| | | | | | | | | | | | ☐ |

**QA/QC Reporting Notes:**
* additional charges may appply

MA DEP MCP CAM Report? [x] Yes [ ] No
CT DPH RCP Report? [ ] Yes [x] No
[x] Standard [ ] No QC
[ ] DQA*
[ ] ASP A* [ ] ASP B*
[ ] NJ Reduced* [ ] NJ Full*
[ ] Tier II* [ ] Tier IV*
[ ] Other: _____
State-specific reporting standards:

SC50648-01
02

| Relinquished by: | Received by: | Date: | Time: | Temp °C |
|---|---|---|---|---|
| | | 9-20-18 | 1405 | Observed |
| | | | | Correction Factor |
| | | | | Corrected |
| | | | | IR ID # |

[ ] EDD format: send report to
[x] E-mail to: jennifer.atkins@aecom.com

Condition upon receipt: Custody Seals: [ ] Present [ ] Intact [ ] Broken
[ ] Ambient [ ] Iced [ ] Refrigerated [ ] DI VOA Frozen [ ] Soil Jar Frozen